PROCEEDINGS OF THE
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ORDINARY MEETING

WEDNESDAY, 6th JULY, 1960, at 5.30 p.m. (Tea 5 p.m.)

AGENDA

1. Confirmation of the Proceedings of the Ordinary Meeting held on 1st June, 1960.
2. Recommendations of candidates for Fellowship. First reading.
3. Recommendations of candidates for Fellowship. Second reading.
4. Announcement of election of new Fellows.
5. Additions to the Library [see p. 20].
6. Admission of Fellows.
7. Exhibits.
8. Communications.

1. **Professor C. D. Michener** (a visitor)

Origin and evolution of social behaviour in bees

[ABSTRACT]

Social behaviour appears to have arisen repeatedly and independently among bees. It has appeared in groups as widely separated as the Halictidae, the Xylocopinae and the Apinae. The present paper will deal primarily with the first of these groups, in which primitive societies seem to have arisen in genus after genus.

In addition to solitary forms among the Halictidae, there are (1) those in which several egg-laying females occupy a single nest, each making and provisioning her own cells, (2) those in which co-operative activity (*e.g.*, provisioning of cells) occurs among several females in a single nest, and (3) a sequence in the differentiation of female castes, both behaviourally and in size, culminating in some whose life histories do not differ greatly in basic features from that of *Bombus*.

Nest structure seems to be a more conservative character than social behaviour; within several genera or subgenera, the nest structure is rather uniform among all species although various degrees of social development and caste differentiation exist.

Communication of food sources and even social facilitation and recognition of the foreign origin of individuals from different nests do not appear to occur in Halictidae.

Noteworthy facts are (1) the early stage in social evolution when division of labour arises (colonies of one egg-layer and one worker are known), (2) sharpness and striking nature of behavioural differences between castes even in species whose castes are scarcely different externally, and (3) the early stage in social evolution in which average size differences distinguish the castes.

2. Dr. W. Cottier

Control of a weed (" Manuka ") in New Zealand by a Coccid, *Eriococcus orariensis* Hoy

[ABSTRACT]

In New Zealand we have witnessed the control of a native plant by a Coccid that accidentally entered the country. The plant is manuka, *Leptospermum scoparium* Forst., and the insect is a species of *Eriococcus*. A study of this phenomenon was undertaken in an attempt to unravel the relationship between the two, because it seemed that this was a case of a native plant being destroyed by an exotic insect. Despite world-wide enquiries the species of *Eriococcus* could not be identified and it was finally given a new name (*E. orariensis* Hoy). Thousands of acres of manuka have been destroyed by this insect and this destruction has been welcomed by farmers who regard the plant as a weed. Investigation has shown that *E. orariensis* apparently originated in Australia and it is supposed to have been carried to New Zealand on air currents. The cycle of biological balance is now altering because *E. orariensis* is being attacked by a parasitic fungus, *Myrangium thwaitessi* Petch, and in areas where *Myrangium* flourishes manuka is rapidly coming back as a pest weed. It would be possible to introduce at least one other species of *Eriococcus* that might prove to be more devastating than has been *E. orariensis* but because of the controversial nature of the subject it is not proposed to do this.

NOTICES

The next meeting will be held on *Wednesday, 5th October*, 1960 :

(1) **Professor Brian Hocking.**—Some aspects of aggregation in insects.
(2) **Mr. C. L. Bell.**—A film of the life history of the Marsh Fritillary.

PROCEEDINGS OF THE ORDINARY MEETING HELD ON 1ST JUNE, 1960

Dr. B. P. UVAROV, C.M.G., F.R.S., President, in the Chair

Present, 89 Fellows and 13 Visitors

Before the meeting formally opened the President extended a welcome to Dr. D. Jensen of Berkeley, California, and Dr. W. R. M. Mason of Ottawa.

The minutes of the meeting held on 4th May, 1960, were confirmed and signed by the President.

The names of the following candidates for election were read for the first time : Mr. Edwin Dharmaraju ; Dr. Derek Anthony Duckhouse, B.Sc., Ph.D. ; Mr. Radheshyam Gokulpure ; Dr. Avinash Chandra Mathur ; Dr. Peter Lamont Miller ; and Mr. D. C. Swan, M.Sc.

For the second time (taken as read) : Mr. Richard K. Allen ; Mr. Colin Anderson ; Dr. David Gerald Hessayon, Ph.D., B.Sc. ; Dr. Francis Godfrey Smith, D.Sc. ; and Mr. Sidney George Peter Stratton.

The Secretary read the names of the following newly elected Fellows of the Society : Mr. Henry James Berman, 48 Ramsey Road, St. Ives, Hunts. ; Mr. Albert Catley, B.Sc., Department of Agriculture, Stock and Fisheries, Konedobu, Papua ; Mr. Ernest Dearing, B.Sc., 37, Ormerod Road, Burnley, Lancs. ; Mr. Jan Heeg, B.Sc., Department of Zoology, Rhodes University, Grahamstown, South Africa ; Mr. Vincent Clifford Moran, B.Sc., Rhodes University, Grahamstown, South Africa ; and Mr. John Frederick Thompson, 60 Cadogan Square, London, S.W.1.

Thanks were voted to donors of gifts to the Library since the last meeting.

Dr. M. S. K. Ghauri, Mr. W. F. Nolde and Mr. T. R. Odhiambo signed the Obligation Book and were admitted Fellows of the Society.

Dr. J. W. Evans said that he would like to take advantage of his visit to this country and the invitation to speak at the present meeting to acknowledge the great contribution made by Dr. W. E. China to the study of the Hemiptera during the past 35 years.

During this time Dr. China's advice and guidance had been readily available to students of this Order, whose published writings owed much to his help. He therefore welcomed this opportunity of presenting to Dr. China a volume of tributes from Hemipterists all over the world.

Mr. R. G. Fennah said he was particularly happy to associate himself with these remarks.

The President then presented the volume to Dr. China.

In acknowledging the tribute, Dr. China thanked all those who had taken part, and said that, although he would retire shortly from the British Museum, he looked forward to continuing his work and association with them.

Dr. J. W. Evans gave a paper on some Homoptera of outstanding interest, an abstract of which appeared on page 13.

In the discussion which followed, Dr. T. R. E. Southwood observed that some Cercopids also had subterranean larvae, but Dr. Evans said they were not subterranean in the sense of *Cicada* larvae, which showed adaptations for digging, but simply passed part of their lives underground.

Dr. P. T. Haskell referred to Dr. Evans' remarks regarding the production of sound by tymbal organs in the Cicadas. He agreed that these organs were highly developed in these insects but they were not restricted to them and were found also in the Lepidoptera and in certain other insects. He asked whether there was any evidence of congregation in *Darthula*, where tymbals are found in the nymph as well as in the adults. Dr. Evans said he did not know whether this was so ; nymphs of Eurymelids are gregarious but lack tymbals.

Mrs. K. J. Richardson mentioned that it was a common pastime for children in China to catch adult Cicadas in simple traps. Dr. Evans said that in Australia they were not so accessible, but mentioned that it has been reported that in Malaya they can be attracted by rhythmic hand clapping.

Professor Howard A. Schneiderman (a visitor) gave a paper on the distribution in nature of substances with juvenile hormone activity and its possible significance, an abstract of which appeared on pages 13 and 14.

In the discussion which followed, Professor G. C. Varley asked if anything was known of the effect of the substances containing juvenile hormone on mammals. Professor Schneiderman replied that no recorded information was available ; although the substances were widespread in nature they were only present in quantity in very few places, so that the amount available for experimental work was restricted. Hormone replacement experiments had, however, been carried out with rats, tadpoles, etc., but with no definite results.

Mr. M. J. Way asked whether extract from *cecropia* moths, which was the most active, had been used on other insect species to which Professor Schneiderman replied that this had been done with marked results and there did not appear to be species specificity. Mr. Way also asked whether the juvenile hormone acted in adult ovary maturation. Professor Schneiderman said that juvenile hormone extracts had not been shown to have gonadotropic action in any insect although numerous experiments had been performed. He referred to recent experiments of H. J. de Wilde of Amsterdam and Martin Lüscher of Berne which indicated that the gonadotropic principle of the corpora allata and the juvenile hormone are not identical.

In reply to a question by Dr. A. G. Hamilton as to whether any attempt had been made to produce the extract synthetically, Professor Schneiderman said that many pure substances had been screened but without results.

Mr. C. E. Dyte asked if it had been possible to make the larva become an adult. Professor Schneiderman said that this had not been done but the complete pupal stage was not obligatory. It was possible to cause larval epidermis in certain parts of the body to form adult cuticle and scales by removing the corpora allata from the larva at exactly the right time, so that a curious mixture of adult and pupa resulted.

Mr. M. E. Solomon asked if there was any known antagonistic substance to the juvenile hormone. Professor Schneiderman replied in the negative, adding that once the hormone structure was known an attempt could then be made to produce an "anti-hormone".

Mr. R. W. J. Uffen asked if the juvenile hormone broke down after ingestion, and Professor Schneiderman replied that some of the hormone had been found in the faeces; possibly fully grown larvae excreted some part to ensure normal pupation, but nothing was really known.

Dr. N. E. Hickin asked if anything was known of a relation between the juvenile hormone and substances used by social insects to prevent development of workers, etc. Professor Schneiderman said that no detailed information was available, but that several lipoid extracts of insects had such effects on social insects. It was possible that other factors were involved.

PAUL FREEMAN, *Honorary Secretary.*

ADDITIONS TO THE LIBRARY

Presented

FEDOROWICZ, Z. Ewolucjonizm na Uniwersytecie Wileńskim przed Darwinem. 8vo. Warsaw. 1960. [*Memorabilia Zoologica.* **4**] [The Publishers.]

IMMS, A. D. *Outlines of Entomology.* 5th ed. Revised by R. G. Davies and O. W. Richards. 8vo. Methuen. 1959. [Mr. R. G. Davies.]

KEVAN, D. K. McE. A study of the genus *Chrotogonus*, Audinet-Serville, 1839 (Orthoptera: Acridoidea: Pyrgomorphidae.) [*Publ. cult. Cia. Diamant. Angola.* **43**: 1–246, 1959.] [The Author.]

LODOS, N. Orta Anadoluda meyva ağaçlarinda zarar yapan Curculionidae (Hortumlu Böcekler) türleri üzerinde sistematik arastirmalar. 8vo. 1960. [*Ege Üniversitesi Ziraat Fakültesi Yayinlari.* **29.**] [The Author.]

MACNEILL, N. A study of the caudal gills of dragonfly larvae of the sub-order Zygoptera. [*Proc. Roy. Irish Acad.* (B) **61**: 115–140, 1960.] [The Author.]

SELANDER, R. B. and BOUSEMAN, J. K. Meloid Beetles (Coleoptera) of the West Indies. [*Proc. U.S. Nat. Mus.* **3**: 197–226, 1960.] [The Publishers.]

TIMBERLAKE, P. H. A revisional study of the bees of the genus *Perdita* F. Smith, with special reference to the fauna of the Pacific Coast. (Hymenoptera, Apoidea.) 8vo. 1960. [*Univ. Calif. Publ. Ent.* **17**: 1–156.] [The Publishers.]

Zoology of Iceland. 8vo. Copenhagen and Reykjavik, 1959.
Vol. III, 46a. *Coleoptera.* 1. Synopsis. S. G. Larsson and G. Gigja.
46b. *Coleoptera.* 2. General remarks. S. G. Larsson.
[Mr. R. G. Davies.]

Purchased

FÖRSTER, W. and WOHLFAHRT, T. *Die Schmetterlinge Mitteleuropas.* Band III, Lief. 7–14. 4to. Stuttgart, 1957–1960.

FRIDEN, F. *Frass drop frequency in Lepidoptera.* 8vo. Uppsala. 1958.

MATHER, B. and K. The Butterflies of Mississippi. 8vo. New Orleans. 1958. [*Tulane Studies in Zoology.* **6**: 63–109.]

Proceedings of a symposium on insects and food plants. Wageningen, May 27–29, 1957, under the auspices of the Comité européen de Zoologie Agricole and the Agricultural University, Wageningen. 8vo. Wageningen. 1958.

STICHEL, H. W. *Illustrierte Bestimmungstabellen der Wanzen.* II. Europa (*Hemiptera Heteroptera Europae*). Vol. 3. Heft 9. 8vo. Berlin–Hermsdorf. 1960.

An addition, separates have been presented by Dr. J. L. Cloudsley-Thompson; Mr. M. Niblett; Mr. C. N. Smithers; Commonwealth Institute of Entomology; Mr. H. E. Box; Anti-Locust Research Centre; Dr. W. Peters; United States Department of Agriculture; Miss D. J. Jackson; The Hope Department of Entomology, Oxford; Companhia de Diamantes de Angola; Professor C. M. Biezanko; and Dr. C. A. Clarke.

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